

AMENDMENTS TO THE CLAIMS

1-27. (canceled)

28. (new) A method for detecting defects in masks used in a lithography process to pattern structures on a workpiece, wherein the lithography process comprises the use of lithographic parameters, comprising:

generating an aerial image of at least a portion of a mask, wherein the mask is formed using original pattern data;

generating a simulated image, wherein the simulated image comprises a prediction of the image formed by the mask during its use in the lithography process as created by the interaction of the original pattern data and the lithographic parameters, and not merely by smoothing the geometries of the original pattern data; and

comparing the aerial image to the simulated image.

29. (new) The method of claim 28, wherein the mask includes proximity effect corrections.

30. (new) The method of claim 29, wherein the simulated image is generated from original pattern data which includes the proximity effect corrections.

31. (new) The method of claim 28, wherein the mask includes phase shifting techniques.

32. (new) The method of claim 28, wherein the masks are used in the manufacture of integrated circuits.

33. (new) The method of claim 28, wherein the mask comprises an x-ray mask.

34. (new) The method of claim 28, wherein the mask comprises a stencil mask for ion projection lithography.

35. (new) The method of claim 28, wherein the mask comprises a mask for electron beam projection lithography.

36. (new) The method of claim 28, wherein the aerial image and the simulated image are generated out of focus.

37. (new) The method of claim 28, wherein the mask includes proximity effect correction techniques and phase shifting techniques.

38. (new) A method for detecting defects in masks used in a photolithography process to pattern structures on a workpiece, comprising:

generating an aerial image of at least a portion of a mask, wherein the mask is formed using original pattern data;

generating a simulated image, wherein the simulated image comprises a prediction of the image formed by the mask during its use in the photolithography process through an assessment of optical physics, and not merely by smoothing the geometries of the original pattern data; and

comparing the aerial image to the simulated image.

39. (new) The method of claim 38, wherein the mask includes proximity effect corrections.

40. (new) The method of claim 39, wherein the simulated image is generated from original pattern data which includes the proximity effect corrections.

41. (new) The method of claim 38, wherein the mask includes phase shifting techniques.

42. (new) The method of claim 38, wherein the masks are used in the manufacture of integrated circuits.

43. (new) The method of claim 38, wherein the mask comprises an x-ray mask.

44. (new) The method of claim 38, wherein the aerial image and the simulated image are generated out of focus.
45. (new) The method of claim 38, wherein the mask includes proximity effect correction techniques and phase shifting techniques.
46. (new) An apparatus for detecting defects in a photomask, comprising:
an aerial image measurement system for generating an aerial image of a portion of a photomask incorporating proximity effect corrections;
a simulated image generating system for generating a simulated image derived from original pattern data of the photomask, wherein the simulated image generating system does not merely smooth the geometries but instead predicts the simulated image through an assessment of optical physics; and
a comparator for comparing the aerial image and the simulated image.
47. (new) The apparatus of claim 46, wherein the stimulated image generating system comprises an aerial image measurement system.
48. (new) The method of claim 46, wherein the photomask includes proximity effect corrections.
49. (new) The method of claim 48, wherein the simulated image is derived from original pattern data which includes the proximity effect corrections.
50. (new) The method of claim 46, wherein the mask includes phase shifting techniques.
51. (new) The method of claim 46, wherein the masks are used in the manufacture of integrated circuits.
52. (new) The method of claim 46, wherein the mask comprises an x-ray mask.

53. (new) The method of claim 46, wherein the aerial image measurement system and the simulated image generating system respectively generate the aerial image and the simulated image out of focus.

54. (new) The method of claim 46, wherein the mask includes proximity effect correction techniques and phase shifting techniques.